

AMENDMENTS TO CLAIMS

1-29. (Canceled)

30. (Currently Amended) A layered polymer scaffold comprising a plurality of synthetic biopolymer membranes of from 1 micron to 1 millimeter in thickness which comprise at least one organized feature having at least one dimension of about 10 to 100 microns, wherein said scaffold is microfabricated by a process method comprising:

generating an elastomer mold;

directing a synthetic biopolymer hydrogel into the mold, ~~wherein the hydrogel comprises a synthetic polymer~~;

curing the synthetic biopolymer in the mold to form at least one membrane of the plurality of synthetic biopolymer membranes, wherein said membrane comprises a surface with varying topology including the at least one feature with at least one dimension of about 10 to 100 microns, wherein said at least one feature is formed from the synthetic polymer by the microfabrication process;

removing said membrane from the mold; and

assembling two or more of said membranes to provide the layered polymer scaffold.

31. (Currently Amended) A microfabricated polymer scaffold comprising at least one membrane, wherein said at least one membrane i) comprises a synthetic biopolymer, ii) is from 1 micron to 1 millimeter in thickness and iii) comprises a surface with varying topology including at least one organized feature formed from the biopolymer during microfabrication with at least one dimension of about 10 to 100 microns.

32-33. (Canceled)

34. (Previously Presented) The polymer scaffold of claim 30, wherein the elastomer is selected from the group consisting of a silicone polymer, a poly(dimethylsiloxane) (PDMS) and an epoxy polymer.

35-37. (Canceled)

38. (Previously Presented) The polymer scaffold of claim 30, wherein the synthetic biopolymer is selected from the group consisting of poly(L-lactic acid; PLLA); poly(DL-lactic acid; PLA); poly(DL-lactic-co-glycolic acid); PLGA and copolymers and blends thereof.

39. (Withdrawn) The polymer scaffold of claim 30, wherein said method further comprising coating the cured polymer scaffold with a substance that modulates cell adhesion selected from the group consisting of polysaccharides, peptides and proteins.

40. (Withdrawn) The polymer scaffold of claim 39, wherein the substances promote cell adhesion.

41. (Withdrawn) The polymer scaffold of claim 40, wherein the substance is selected from the group consisting of collagen, fibronectin, vitronectin, Arg-Gly-Asp (RGD) and Tyr-Ile-Gly-Ser-Arg (YIGSR) peptides, glycosaminoglycans (GAGs), hyaluronic acid (HA), integrins, selectins and cadherins.

42. (Withdrawn) The polymer scaffold of claim 39, wherein the substances inhibit cell adhesion.

43. (Withdrawn) The polymer scaffold of claim 42, wherein the substances comprise triblock polymers.

44. (Withdrawn) The polymer scaffold of claim 39, wherein the substances are selected from a list consisting of pluronics, surfactants, bovine serum albumin, poly hydroxyethylmethacrylate, polyacrylamide, and polymethylmethacrylate.

45. (Previously Presented) The polymer scaffold of claim 30, wherein the method further comprises inducing porosity by contacting the polymer with a particulate leaching agent.

46. (Currently Amended) The polymer scaffold of claim 45, wherein the particulate ~~particular~~ leaching agent is selected from the group consisting of a sugar, a salt and a protein.

47. (Canceled)

48. (Previously Presented) The polymer scaffold of claim 30, wherein the step of assembling further comprises attachment of the two or more cured polymer membranes to each other by applying mechanical pressure and heating.

49. (Previously Presented) The polymer scaffold of claim 30, the method further comprising contacting the polymer membranes with cells.

50-52 (Canceled)

53. (Previously Presented) The microfabricated polymer scaffold of claim 31, wherein the synthetic biopolymer comprises a polymer selected from the group consisting of poly(L-lactic acid; PLLA); poly(DL-lactic acid; PLA); poly(DL-lactic-co-glycolic acid); PLGA and copolymers and blends thereof.

54. (Withdrawn) The microfabricated polymer scaffold of claim 31, wherein said at least one membrane is coated with a substance that modulates cell adhesion selected from the group consisting of a polysaccharide, a peptide and a protein.

55. (Withdrawn) The microfabricated polymer scaffold of claim 54, wherein the substance promotes cell adhesion.

56. (Withdrawn) The microfabricated polymer scaffold of claim 55, wherein the substance is selected from the group consisting of collagen, fibronectin, vitronectin, Arg-Gly-Asp (RGD) and Tyr-Ile-Gly-Ser-Arg (YIGSR) peptides, glycosaminoglycans (GAGs), hyaluronic acid (HA), integrins, selectins and cadherins.

57. (Withdrawn) The microfabricated polymer scaffold of claim 54, wherein the substance inhibits cell adhesion.

58. (Withdrawn) The microfabricated polymer scaffold of claim 57, wherein the substance comprises a triblock polymer.

59. (Withdrawn) The microfabricated polymer scaffold of claim 54, wherein the substance is selected from the group consisting of a pluronic, a surfactant, bovine serum albumin, poly hydroxyethylmethacrylate, polyacrylamide, and polymethymethacrylate.

60. (Previously Presented) The microfabricated polymer scaffold of claim 31, wherein the at least one membrane is porous.

61. (Previously Presented) The microfabricated polymer scaffold of claim 31, wherein the at least one membrane is a mesh.

62. (Canceled)

63. (Currently Amended) The microfabricated polymer scaffold of claim 31, wherein the at least one membrane further comprises cells attached to the membrane.

64. (Currently Amended) The microfabricated polymer scaffold of claim [[40]] 31, further comprising cells.

65. (Previously Presented) The polymer scaffold of claim 30, wherein the at least one organized feature comprises through-holes.

66. (Previously Presented) The microfabricated polymer scaffold of claim 31, wherein the at least one organized feature comprises through-holes.

67. (New) A layered polymer scaffold comprising a plurality of synthetic biopolymer membranes of from 1 micron to 1 millimeter in thickness wherein at least one membrane of the plurality of synthetic biopolymer membranes is a mesh comprising open areas with intervening biopolymer areas, the biopolymer areas having a lateral feature width of about 10 to 100 microns, wherein said scaffold is microfabricated by a process comprising:

generating an elastomer mold;

directing a synthetic biopolymer into the mold;

curing the synthetic biopolymer in the mold to form at least one membrane of the plurality of synthetic biopolymer membranes, wherein said membrane comprises a surface with varying topology and comprises the open areas and intervening biopolymer areas having the lateral feature widths about 10 to 100 microns, wherein the at least one feature is formed from the synthetic biopolymer by the process;

removing said membrane from the mold; and

assembling two or more of said membranes to provide the layered polymer scaffold.

68. (New) A microfabricated polymer scaffold comprising at least one membrane, wherein said at least one membrane i) comprises a synthetic biopolymer, ii) is from 1 micron to 1 millimeter in thickness and iii) comprises a surface with varying topology, wherein said at least one membrane is a mesh comprising open areas with intervening biopolymer areas being formed during microfabrication, the biopolymer areas having a lateral feature width of about 10 to 100 microns.

69. (New) The polymer scaffold of claim 67, wherein the elastomer is selected from the group consisting of a silicone polymer, a poly(dimethylsiloxane) (PDMS) and an epoxy polymer.

70. (New) The polymer scaffold of claim 67, wherein the synthetic biopolymer is selected from the group consisting of poly(L-lactic acid; PLLA); poly(DL-lactic acid; PLA); poly(DL-lactic-co-glycolic acid); PLGA and copolymers and blends thereof.

71. (New) The polymer scaffold of claim 67, wherein the method further comprises inducing porosity by contacting the polymer with a particulate leaching agent.

72. (New) The polymer scaffold of claim 71, wherein the particulate leaching agent is selected from the group consisting of a sugar, a salt and a protein.

73. (New) The polymer scaffold of claim 67, wherein the step of assembling further comprises attachment of the two or more cured polymer membranes to each other by applying mechanical pressure and heating.

74. (New) The polymer scaffold of claim 67, the method further comprising contacting the polymer membranes with cells.

75. (New) The microfabricated polymer scaffold of claim 68, wherein the synthetic biopolymer comprises a polymer selected from the group consisting of poly(L-lactic acid; PLLA); poly(DL-lactic acid; PLA); poly(DL-lactic-co-glycolic acid); PLGA and copolymers and blends thereof.

76. (New) The microfabricated polymer scaffold of claim 68, wherein the at least one membrane is porous.

77. (New) The microfabricated polymer scaffold of claim 68, wherein the at least one membrane further comprises cells attached to the membrane.

78. (New) The microfabricated polymer scaffold of claim 68, further comprising cells.

79. (New) The polymer scaffold of claim 68, wherein the at least one organized feature comprises through-holes.